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Solar Wireless Electric Vehicle charging System

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Abstract: *The design of a solar charging station for electric cars is thoroughly explained, along with how it solves the two main problems of fuel and pollution. There are more and more electric cars on the roads today. Electric cars have proven to be effective in lessen the travel cost by switching from fuel to EV's, which is much less expensive, with the environmental benefits. However, in this case, we are developing a charging system for electric cars that provides a unique, solution. There are no cables involved, solar energy is used to maintain the charging system, and no external power source is required. The vehicles can be charged while they are moving. The development of the system involved the use of LCD Displays, batteries, solar grid, control circuits, primary and secondary copper coils, AC to DC converters, At mega processors and inverters. The technique demonstrates how electric automobiles can be recharged while being driven, eliminating the need to stop for recharging. The technology demonstrates how an integrated wireless solar charging system for EV is used.*

Keywords: Electric vehicle, EV charging, solar power, copper coils, At mega controller

I. INTRODUCTION

Numerous problems would exist on the earth without energy. Numerous everyday items, including cellphones, computers, cameras, sensors, bionic implants, satellites, and oil platforms, depend on electricity to function. When there are too many cables connected, using small power outlets can be hazardous and difficult, as Nikola Tesla initially indicated in 1891 while representing the first wireless power transfer system for charging. In 1884, Thomas Parker essentially unveiled the first electric automobile. Before 1859, there were no rechargeable batteries available for storing power. French physicist Gaston Plant solved this problem by creating the lead-acid battery, which had a few advantages. Electric vehicles are getting more and more prevalent throughout many countries. These automobiles can range in size from little to large, like electric bicycles or buses. An electric vehicle operates similarly to a conventional one, with the exception that it propels itself using an electric motor that receives electricity from a battery. [1 The new type of rechargeable battery is used because of its smaller size, greater energy storage capacity and lighter weight than standard lead-acid batteries. For users of plug-in electric vehicles, the charging process is cumbersome. Either the charger is plugged directly into the vehicle or the battery was removed for charging at some point. This demand charging process is generally simplified using inductive power transfer technology [1]. A non moveable transmitter and one/ more moveable secondary receivers are linked through wireless path via Inductive Power Transfer (IPT) technology [1][7]. There are large air gaps between the primary source and the secondary load. Depending on the required performance, the power supply is decided as single-phase or three-phase. Power supply, transmitter (primary coil), receiver (secondary coil), microcontroller, battery, sensors and matching circuit are the basic components of Wireless power transfer system [10]. The IPT system has either a distributed or centralized topology depending on the magnetic structure of the coil. The source produces alternating current in low frequency at transmitter coil. Magnetic fields provide connection between one primary coil and several secondary coils.. IPT systems are not affected by dirt, ice, water or chemicals, making them environmentally friendly in any situation and it is available abundantly [1] [4]. The advancement in power electronics has led to the discovery of many new applications on the IPT system, including wireless power for professional devices, wireless charging of batteries for electric cars through distance between air gaps, and handling of materials [1]–[7]. Other applications of the low-power IPT system include lights, mobile phones, and medical implants [1] to [7]. The interconnection of the IPT system is typically weak. The transmitting coil and the receiving coil are separated electrically from each other. Below is a list of the benefits of the IPT system.

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II. LITERATURE REVIEW

The IPT method which is wireless has been known for years, and presently it is gaining more importance . The primary component of this dissertation is the literature review, and a thorough analysis of the field has been conducted as shown below.

J. C. Ferreira, V. et.al [1] "presented a double-coupled system(DCS) for electric car battery charging. An intermediate coupler is located between the primary coil and the secondary sensor and acts as a switch. Efficiency is increased by sharingall the losses between the branches overall.

P. Venugopal, P. Bauer [2] Describe a new design approach where design factors are considered in the selection of coreless IPT parameters which include ideal number of various coils, capacitors and frequency. This system provides with high efficiency.

S. R Kutwad, S. Gaur et.al [3] Explain a two-way IPT systemthat uses weak magnetic couplings to enable easy wireless transfer power between ends that are separated by an air gap. It is difficult to design a system without an accurate mathematical model. State variables created a dynamic model. This model is a common tool for controller design for steady-state and transient mode of IPT systems.

B. Revathi A. Ramesh, et.al [4] it is possible to extend the transmission power distance between the transmitter and the receiver coil by installing repeaters in the IPT system, accordingly. It is carefully determined where the repeatershould be placed between the transmitter and the receiver. Forproducing the same amount of electricity, the efficiency of the two alternative setups varies greatly. If the repeater is placed nearer to the transmitter than the receiver, the efficiency will improve. A gap of 10-15 cm between the road surface and the bottom of the electric vehicle is significant for vehicles such as trucks or buses, so certain techniques are required to increase the distance of charging. To achieve this, repeaters are inserted

III. NEED OF WIRELESS POWER TRANSFER SYSTEM

As we are using non-renewable sources of energy, fuels such as coal, petrol and diesel will soon disappear. Future transport infrastructure will be limited. As a result, we chooseelectric vehicles for mobility. Greenhouse gas emissions fromvehicles are increasing due to current fuel technologies and gasoline engines [6]. Plug-in for the electric vehicles are used to create environmental friendly transportation and reduce greenhouse gas emissions to some extent. The adoption of PEVs is rapidly increasing, although there are some problems with batteries, such as slower charging, insufficient energy storage capacity, size and weight [1]. New technology ispresently provided for the growth of EVs and overcome battery-related issues. Many consumers have not adopted BEVs as a priority due to charging issues [8]. The concept of a Wireless Power Transfer (WPT) system is initiated and developed to alleviate the problems related to batteries, greenhouse gas emissions and to solve the problem of magnetic field radiation [10]. Since customers can go further by charging their electric vehicles, many charging stations have been installed along the roads. This eliminates the need for a high-capacity battery and replaces it with a smaller battery, making the battery lighter [1].

Simple stationary IPT charging systems allow electric cars to be wirelessly charged while they are parked at home or in the office [3]. These IPT systems are wireless.These systems provide simplicity and reliability. The IPT system hasthe lowest costs compared to existing traditional transport systems. The power supply and track are the most expensive parts and the system installation is also expensive. To achievethese system features and benefits, some system design issuesmust be overcome. The IPT method has advanced significantlyover the past few years and currently gaining more and more attention. The Vehicle-to-Grid concept can advance to the next level with WPT-enabled EVs to achieve a effective energy generation and storage system [3].

IV. CONCLUSION

The system uses wireless charging to recharge the batteryof an electric vehicle uses the idea of IPT. A drive circuit is used between the transmitting coil and the receiving coil and amicrocontroller as a switch. To reduce power wastage and themagnetic field radiation effect, power transfer is enabled by turning on the transmitter circuit when the vehicle is present and turning off power transfer when the vehicle is in off state. The transmitted power of the system is controlled by an AC switch in the designed excitation circuit. The use of an electric car battery charger to test an

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inductive power transfer system is shown. A practical prototype system with high efficiency level is built . The system provides safety and reliability.

REFERENCES

[1]. J. C. Ferreira, V. Monteiro and J. L. Afonso "Smart Electric Vehicle Charging System" IEEE Intelligent Vehicles Symposium (IV), 2011, pp.758-763

[2]. P. Venugopal , P. Bauer, G. R. C. Mouli "Future of Electric Vehicle Charging" International Conference on signal processing, Communication, Power and Embeddedsystem, 2016, pp. 441-44

[3]. S. R Kutwad, S. Gaur "Wireless Charging System for Electric Vehicle" International Symposium on Power Electronics (Ee), 2017, pp. 1-7

[4]. B. Revathi , A. Ramesh, S. Sivanandhan "Solar Charger for Electric Vehicles" International Conference on Emerging Trends and Innovation In Engineering And Technological Research(ICETIETR), 2018, pp.1-4.

[5]. K. Anu , J. Elzalet , A. Akila "Charging Station for E-Vehicle using Solar with IOT " International Conference on Advanced Computing &Communication System(ICACCS), 2019, pp. 785-791.

[6]. W. Wenbin et al., "Development of Wireless Charging System for Electric Vehicles Based on Adjustable DC Power Module" IEEE Conference on Industrial Electronics and Applications (ICIEA), 2019, pp. 1419-1424

[7]. P. Lopes, P. Costa and S. Pinto "Wireless Power Charging on Electric Vehicles" International Young Engineers Forum (YEF-ECE), 2021, pp. 132-137.

[8]. X. Liang , M. S. A. Chowdhury "Emerging Wireless Charging Systems for Electric Vehicles – Achieving High Power Transfer Efficiency" IEEE Industry Applications Society Annual Meeting (IAS), 2018, pp. 1-14.

[9]. M. A. Al Mamun, M. Istiak and K. A. Al Mamun "Design and Implementation of A Wireless Charging System for Electric Vehicles" IEEE Region 10 Symposium (TENSYMP),2020, pp. 504-507.

[10]. N. Ramesh, V. Vanitha "Solar Powered Battery Charging System with Maximum Power Point Tracking" International Conference on Electrical Energy Systems(ICEES),2018, pp. 364-368